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A new species of *Fulvifomes* (*Hymenochaetaceae*) from Cambodia

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Abstract — *Fulvifomes cambodiensis* sp. nov. is described and illustrated from Preah Vihear, Cambodia. It produces perennial, pileate and solitary basidiomes with a concentrically sulcate zonate pileal surface, homogeneous context, hymenial setae, and yellowish acyanophilous basidiospores. The new species macroscopically resembles *F. rimosus,* which differs in lacking hymenial setae and having cyanophilous generative hyphae and slightly smaller basidiospores. The macroscopically similar *Fomitiporia hartigii* is distinguished by larger hyaline basidiospores and the absence of setae. *Fulvifomes johnsonianus* has abundant hymenial setae and quite similar hyphal structure to *F. cambodiensis,* but its much smaller basidiospores and effused-reflexed to pileate basidiomes distinguish it from the new species with pileate and ungulate basidiomes with cracked pileal surface.

Key words — *Hymenochaetales,* polypore, taxonomy

Introduction

After Murrill (1914) segregated *Fulvifomes* Murrill (*Hymenochaetaceae* Donk), typified by *F. robiniae* (Murrill) Murrill, from *Phellinus* Quél., many mycologists did not accept his genus (Ryvarden & Johansen 1980, Gilbertson & Ryvarden 1987, Ryvarden & Gilbertson 1994, Núñez & Ryvarden 2000), although it was treated as a subgenus of *Phellinus* by Dai (1999). Recent molecular phylogenetic analyses clearly support it as an independent genus closely related to *Aurificaria* D.A. Reid and *Phylloporia* Murrill (Wagner & Fischer 2002, Larsson et al. 2006). Morphologically, while all three genera produce colored basidiospores, the dimitic hyphal system of *Fulvifomes* distinguishes it from the two monomitic genera (Dai 2010). Except for the dimitic hyphal system and colored basidiospores, *Fulvifomes* species have few distinctive morphological characters (Dai 2010).

During a study on wood-decaying fungi in Cambodia, an unknown *Fulvifomes* species was discovered, which is here described and illustrated as *Fulvifomes cambodiensis*. Morphological differences between *F. cambodiensis* and other similar species according to Chinese materials are also noted.

Materials & methods

The studied specimen was deposited at the herbaria of Guangdong Institute of Microbiology (GDGM) and Institute of Applied Ecology, Chinese Academy of Sciences (IFP). The microscopic procedure follows Dai (2010). Sections were studied at magnification up to ×1000 using a Nikon Eclipse E 80i microscope and phase contrast illumination. The variation in the size of the spores was presented by excluding 5% of measurements from each end of the range, which were given in parentheses. The abbreviations are used as follows: IKI = Melzer's reagent, IKI– = negative in Melzer's reagent, KOH = 5% potassium hydroxide, CB = Cotton Blue, CB– = acyanophilous, L = mean spore length (arithmetic average of all spores), W = mean spore width (arithmetic average of all spores), Q = variation in the L/W ratios within the specimen studied, and n = number of spores, hyphae or setae measured from given number of specimens. Line drawings were made with the aid of a light tube. Special color terms follow Anonymous (1969) and Petersen (1996).

Taxonomy

Fulvifomes cambodiensis L.W. Zhou & W.M. Zhang, **sp. nov.** Figs 1–2

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Differs from *Fulvifomes rimosus* in the presence of hymenial setae, slightly larger basidiospores, and acyanophilous generative hyphae.

Type: Cambodia, Preah Vihear, on angiosperm wood, 12.V.2006, GDGM 20949 (**holotype** in GDGM, **isotype** in IFP).

Etymology: *cambodiensis* (Lat.): refers to the country of Cambodia.

Basidiomes: Perennial, pileate, ungulate, in section triquetrous, usually solitary, woody hard and without odour or taste when dry. Pileus projecting up to 6 cm, 15 cm wide and 8 cm thick at base; pileal surface deep reddish brown to dark clay-buff, glabrous, concentrically sulcate with wide zones, glabrous with age, cracked to slightly rimose with age, margin obtuse. Pore surface yellowish brown, sterile margin yellowish brown, up to 10 mm; pores round to angular, 5–6 per mm; dissepiments thin, entire. Context cinnamon, woody hard, up to 13 mm thick. Tubes cinnamon, woody hard, tube layers distinct, annual layer up to 3 mm long.

Hyphal structure: Dimitic; generative hyphae without clamp connections; skeletal hyphae IKI–, CB–; tissues darkening but otherwise unchanged in KOH.

Context: Generative hyphae scanty, hyaline, thin-walled, occasionally branched, 2–3 μm in diam; skeletal hyphae dominant, yellowish brown, thick-

Figure 1. *Fulvifomes cambodiensis* basidiocarp (holotype).

walled, flexuous, unbranched, without a simple septum, tightly interwoven, 3–5 µm in diam (n = 10/1).

Tubes: Generative hyphae frequent, hyaline, thin-walled, occasionally branched, frequently septate, sometimes diminishing at the end or middle, 1.7–2.5 µm in diam; skeletal hyphae dominant, yellowish brown, thick-walled with a distinct lumen to subsolid, flexuous, unbranched, interwoven, sometimes agglutinated, 2–3.5 µm in diam (n = 10/1). Hymenial setae frequent, dark brown, subulate to ventricose, thick-walled, 12.7–30.4 × 6.5–17 µm (n = 10/1). Hymenium collapsed, cystidia, cystidioles, basidia and basidioles not seen.

Spores: Basidiospores broadly ellipsoid, yellowish, thick-walled, smooth, CB–, IKI–, (5.5–)5.8–6.2(–6.3) × (4.5–)4.6–5.2 µm, L = 5.98 µm, W = 4.95 µm, Q = 1.21 (n = 30/1).

Remarks: *Fulvifomes cambodiensis* is macroscopically characterized by solitary perennial, pileate, woody hard basidiomes with a crust-covered and concentrically sulcate pileal surface and homogeneous context; microscopically it has hyaline thin-walled generative hyphae, yellowish brown thick-walled skeletal hyphae, hymenial setae, and yellowish acyanophilous basidiospores.

Fulvifomes rimosus (Berk.) Fiasson & Niemelä shares with *F. cambodiensis* a perennial pileate ungulate growth habit, concentrically sulcate zonate pileus,

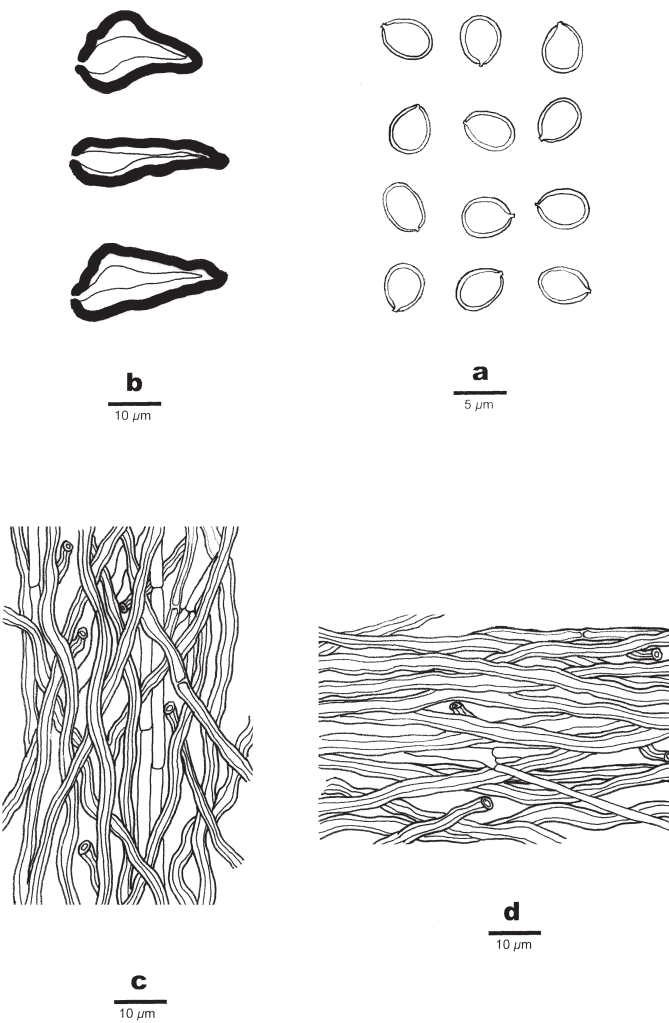

Figure 2. *Fulvifomes cambodiensis* (holotype).
a: Spores. b: Setae. c: Hyphae from trama. d: Hyphae from context.

and obtuse pileal margin. However, the basidiomes of *F. rimosus* are darker. Microscopically, *F. rimosus* lacks hymenial setae and has slightly smaller basidiospores (L = 5.54 μm, W = 4.54 μm) and cyanophilous generative hyphae (Dai 2010).

The macroscopically similar *Fomitiporia hartigii* (Allesch. & Schnabl) Fiasson & Niemelä shares with *F. cambodiensis* the perennial and ungulate basidiomes with the concentrically sulcate cracked pileal surface, obtuse pileus margin, and almost identical pore sizes (Dai 2010), making the two species very hard to differentiate in the field. But *F. hartigii* is distinguished by its wider hyphae, lack of setae, and larger hyaline basidiospores that are dextrinoid and strongly cyanophilous (Dai 2010).

Fulvifomes johnsonianus (Murrill) Y.C. Dai has quite similar hyphal structure to *F. cambodiensis,* and the two species also share abundant hymenial setae and ellipsoid basidiospores (Q = 1.23, Dai 2010). However, *F. johnsonianus* has much smaller basidiospores (2.8–3.2 × 2.2–2.6 μm; Dai 2010). Macroscopically, *F. johnsonianus* has effused-reflexed to pileate basidiomes, which are easily differentiated from the pileate and ungulate basidiomes with cracked pileal surface of *F. cambodiensis* (Dai 2010).

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